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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,714	12/05/2001	Scott Meikle	303.444US5	2321

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EXAMINER

PERALTA, GINETTE

ART UNIT PAPER NUMBER

2814

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/004,714

Applicant(s)

MEIKLE ET AL.

Examiner

Ginette Peralta

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 38-74 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 38-74 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 41-74 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a tungsten nitride layer, does not reasonably provide enablement for a tungsten nitride layer that includes silicon. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Applicant's specification is directed to a capacitor comprising a tungsten nitride electrode or electrodes, there is no enablement for a tungsten nitride layer including silicon, if the tungsten nitride layer were to include silicon then it would be a tungsten silicon nitride electrode, and not a tungsten nitride layer, furthermore, applicant's specification mentions the use of silane on the deposition of the tungsten nitride layer but no basis is provided for the silicon to be included in the deposited tungsten nitride layer. Furthermore, this would be a process limitation and the claims are directed to a device.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 41, 43-48, 51, 58, and 60 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Masuhashi (JP 406275776 A).

Regarding claims 41 and 46, Matsushashi discloses a capacitor comprising a first electrode 15a; a second electrode 35; and a dielectric 19 disposed between the first and second electrode; wherein the second electrode includes tungsten nitride.

Regarding claims 43 and 47, Matsushashi further discloses the capacitor being a non-planar capacitor.

Regarding claims 44 and 48, Matsushashi discloses the dielectric comprising tantalum oxide.

Regarding claim 45, it is an inherent property of the tungsten nitride material that it would prevent degradation of the tantalum oxide dielectric.

Regarding claim 51, Matsushashi discloses the first electrode formed as a conformal polycrystalline silicon layer.

Regarding claim 48, Matsuhashi discloses a non-planar capacitor comprising a polycrystalline silicon film 15a; a dielectric layer 19 disposed on the polycrystalline silicon film, and a film of only tungsten nitride disposed on the dielectric layer.

Regarding claim 60, the dielectric layer includes tantalum oxide.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 38-40, 42, 49, 50, 52-57, 59, and 61 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuhashi.

Regarding claims 38, 49, 50, 55, 56, and 61 Matsuhashi teaches a first electrode formed of polysilicon 15a, a second electrode formed of tungsten nitride, and a dielectric layer located between the first and second electrode.

Matsuhashi et al. teaches all the limitations in the claim with the exception of the chemical vapor deposition of tungsten nitride.

It is noted that where a product by process claim is rejected over a prior art product that appears to be identical, although produced by a different process, the burden is upon the applicants to come forward with evidence establishing an unobvious difference between the two. *In re Harosi*, 218 USPQ 289 (Fed. Cir. 1983).

Regarding claim 39, Matsuhashi discloses the dielectric layer comprising tantalum oxide.

Regarding claim 40, Matsuhashi discloses a plurality of capacitors that are memory cells.

Regarding claims 42, 52, Matsuhashi discloses the claimed invention except for both the first electrode and the second electrode including only tungsten nitride. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have both electrodes being formed of tungsten nitride, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

Regarding claim 53, Matsuhashi further discloses the capacitor being a non-planar capacitor.

Regarding claim 54, Matsuhashi discloses the dielectric comprising tantalum oxide.

Regarding claim 57, Matsuhashi discloses the claimed invention except for the second electrode including polycrystalline silicon. It would have been obvious to one having ordinary skill in the art at the time the invention was made to the first or second electrode of polycrystalline silicon, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

5. Claims 62-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuhashi in view of Wolf, *Silicon Processing for the VLSI Era, Vol. 2: Process Integration*.

Regarding claims 62 to 65, Matsushashi teaches a conformal polycrystalline silicon film formed over a substrate, a dielectric layer formed on the conformal polycrystalline silicon film; and a film of tungsten nitride formed on the dielectric layer; wherein the dielectric layer includes tantalum nitride.

Matsushashi discloses the claimed invention with the exception of the conformal polycrystalline silicon layer being formed over transistor devices and the method of deposition of the tungsten nitride.

It is noted that where a product by process claim is rejected over a prior art product that appears to be identical, although produced by a different process, the burden is upon the applicants to come forward with evidence establishing an unobvious difference between the two. *In re Harosi*, 218 USPQ 289 (Fed. Cir. 1983).

Wolf teaches in pages 613 to 615 a conventional semiconductor device comprising a capacitor and transistor structures, wherein the polycrystalline silicon film is deposited over the transistor structures.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include transistor structures underlying the polycrystalline silicon film, since it was known in the art that capacitors are built over transistor structures as Wolf teaches that is conventionally used.

Regarding claims 66 to 68, Matsushashi teaches a first electrode, a dielectric layer formed on the first electrode, and a film of tungsten nitride formed on the dielectric layer.

Matsuhashi discloses the claimed invention with the exception of the conformal polycrystalline silicon layer being formed over transistor devices and the method of deposition of the tungsten nitride.

It is noted that where a product by process claim is rejected over a prior art product that appears to be identical, although produced by a different process, the burden is upon the applicants to come forward with evidence establishing an unobvious difference between the two. *In re Harosi*, 218 USPQ 289 (Fed. Cir. 1983).

Regarding claim 69, Matsuhashi discloses a substrate, and a non-planar capacitor including a first electrode, a second electrode, and a dielectric disposed between the first and second electrodes, wherein at least one of the first and second electrodes includes tungsten nitride.

Matsuhashi discloses the claimed invention with the exception of the transistor device formed on the substrate.

Wolf teaches in pages 613 to 615 a conventional semiconductor device comprising a capacitor and transistor structures, wherein the polycrystalline silicon film is deposited over the transistor structures.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include transistor structures underlying the polycrystalline silicon film, since it was known in the art that capacitors are built over transistor structures as Wolf teaches that is conventionally used.

Regarding claims 70-72, Matsuhashi discloses the claimed invention except for the second electrode including polycrystalline silicon. It would have been obvious to one having ordinary skill in the art at the time the invention was made to the first or second electrode of polycrystalline silicon, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

Regarding claim 73, Matsuhashi discloses tantalum oxide as the dielectric layer.

Regarding claim 74, it is an inherent property of the tungsten nitride material that it would prevent degradation of the tantalum oxide dielectric.

Response to Arguments

3. Applicant's arguments filed 11/5/02 have been fully considered but they are not persuasive.

With regards to applicant's argument that the applicant is unable to find in the Matsuhashi reference a showing or suggestion of a capacitor comprising a second electrode formed of chemically vapor deposited tungsten nitride in which the tungsten nitride is formed using a gas comprising nitride, tungsten and silicon, it is noted that the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

With regards to applicant's argument that the method taught in the specification results in a tungsten nitride layer including silicon, it is noted that there is no single statement in the specification that reads that the layer formed is a "tungsten nitride layer including silicon" furthermore, if the layer were to include silicon then it would

become a tungsten silicon nitride layer(WSiN), which is not mentioned in the specification as being the formed layer.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (703)305-7722. The examiner can normally be reached on Monday to Friday 8:00 AM- 5:30 PM.

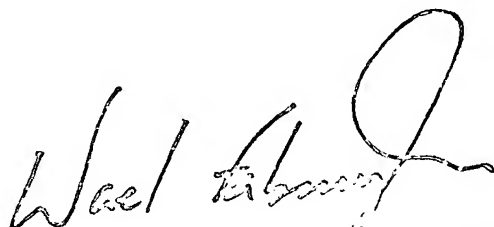
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703)308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

GP
January 9, 2003


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